

THE PROBLEM OF THE SWEET POTATO IN POLYNESIA

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IF WE accept the present conclusions of the botanists that the sweet potato is a plant of undoubted Central or South American origin, then the fact of its widespread occurrence in Polynesia in the eighteenth century, as reported by the great explorers of the period, can be explained only in one of three ways. Either the plant had been introduced by the Spanish from South America in the sixteenth and seventeenth centuries when the earliest European discoveries in the Pacific were being made, or it was of pre-Columbian introduction accomplished either by Polynesians who visited South America and brought the new food plant back with them, or by Peruvian or other American Indian navigators who carried it with them in exploring voyages to the west.

The theory of a Spanish introduction was put forward nearly a hundred years ago, and has had various modern adherents, notably Friederici¹ in Germany and Laufer² in this country. It is with this theory of a Spanish origin that I propose to deal in this paper. If this explanation of the presence of the sweet potato in Polynesia is correct, it follows that the fact can no longer be pointed to as evidence of trans-Pacific cultural diffusion. If, on the other hand, such an explanation can be shown to be not only improbable but apparently impossible, then the problem of pre-Columbian contacts between Polynesia and South America takes on a greater significance.

Friederici has stated most clearly and in greatest detail the arguments in favor of a Spanish introduction. These may be summarized briefly as follows. Mendaña and Quiros, the Spanish explorers of the end of the sixteenth and the beginning of the seventeenth centuries who discovered the Marquesas group in Polynesia and the Santa Cruz, Solomon, and New Hebrides groups in eastern Melanesia, do not mention the existence of the sweet potato in these islands. We may therefore assume that at that time it was unknown in the Pacific. As they sailed from Peru where the sweet potato was an old and important food product, they may be presumed to have carried supplies of it with them for their use. Since, further, the Spanish always made it a point to plant seeds of all kinds in the prosecution of their discoveries in order to introduce familiar foods into the new lands, we may also assume, even though it is not specifically mentioned, that they planted the sweet potato in all these islands. From these points then, the Marquesas in Polynesia and Santa Cruz, the Solomons and New

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Hebrides in eastern Melanesia, the cultivation of the plant was diffused throughout the whole area in which it was found at the end of the eighteenth century. This conclusion is further strengthened by the fact that it is known that the Spanish introduced the sweet potato in the Philippines in the sixteenth century, and that from there it was diffused to China, Formosa, Japan, Indonesia, and southeast Asia. The argument as presented seems superficially plausible, but I believe it is possible to show (1) that it rests mainly on negative or uncertain evidence; (2) that the assumptions made are not wholly justifiable; and (3) that there is on the other hand a large body of evidence, both direct and indirect, which renders impossible any theory of the origin of the sweet potato in Polynesia as due to a Spanish introduction.

The basis of the theory is the asserted absence of the sweet potato in the Pacific area at the time of the first Spanish contacts. Let us see just what evidence there is for this statement. Mendaña discovered the Marquesas in 1595 and spent a week or so at the island of Tahuata. Referring to the food plants used by the natives, his chronicler Quiros³ speaks of breadfruit, coconuts, plantains, sugarcane, and one or two other things, but makes no mention either of yams or sweet potatoes. It is on this absence of any specific reference to the sweet potato in the Marquesas, that the assertion is based that it was unknown throughout the *whole* of Polynesia at the end of the sixteenth century. As we have no data on any of the other portions of Polynesia at this time, the universal negative is quite unjustifiable. Furthermore it may be asked, if this negative evidence is to be held conclusive and valid for the absence of the sweet potato, why is it not equally good for the yam? Neither is mentioned by Quiros, yet both were found in the Marquesas when they were revisited at the end of the eighteenth century. No one has, so far as I know, been bold enough to claim that the yam was also introduced by the Spanish, yet the negative evidence holds good equally for both. Again, Quiros' failure to mention the sweet potato is repeated by nearly all of the visitors to the group until well after the beginning of the nineteenth century. His negative evidence thus applies only to a single group where rarely in the fifty years subsequent to its rediscovery was the sweet potato of sufficient significance to attract attention. The negative evidence of Quiros is no more valid than that of Cook, Forster, Krusenstern, Lisiansky, Porter, Shillibeer, and Stewart, all of whom failed to refer to the sweet potato, although we know from Marchand⁴ that as early as 1790 the plant was there. It cannot be said, therefore, that the evidence relied on to

¹ Friederici.

² Laufer.

³ Quiros, 1: 16-29.

⁴ Marchand, 1: 91; English translation, 1: 83.

prove the absence of the sweet potato throughout all Polynesia at the end of the sixteenth century is of any value whatever.

If we turn next to eastern Melanesia, the facts are as follows. In 1568 Mendaña discovered the Solomon group and spent several months in its exploration. Neither in Catoira's account of the voyage, which is the fullest in detail, nor in any of the others, is there any reference to the sweet potato, only to taro, yams and "panaes."⁵ The latter are described as "a kind of root resembling the potato of Peru" and as "better than the potato." As the term "pana" in various dialectic variations is the word used in the Solomons for the prickly-vine yam⁶ there can be no doubt but that it was the plant referred to. Although the expedition had set out with the idea of making a settlement in any lands they might find, no attempt was made to do so here, and no reference is made by any of the chroniclers to any planting having been done. In 1595 Mendaña's ill-starred attempt at colonization took place in Santa Cruz. His chronicler Quiros describes⁷ "two or three kinds of roots like the potato" as used by the natives. It seems probable that these are to be identified with the "panaes" found in the earlier voyage to the Solomons.⁸ In 1606 in the bay of St. Phillip and St. James in northern Espiritu Santo of the New Hebrides, Quiros speaks of the people eating roots with flesh of various colors, some of which "tasted like the potatoes of Peru."⁹ On the map of the bay of St. Phillip and St. James, drawn by Quiros' cartographer, Diego de Prado y Tobar,¹⁰ there is a legend stating that "their food consists of yams, potatoes,¹¹ plantains" etc. If, however, we turn to the accounts of the voyage given by Quiros' pilot De Leza (which version Friederici seems to have overlooked), what seems to be specific evidence is at hand. For he states¹² that at the bay of St. Phillip and St. James the natives had in abundance "camotes and yams." Now "camote" is a term for the sweet potato of Mexican origin adopted there by the Spanish and introduced with the plant by them in the Philippines. De

⁵ Mendaña, 1: 50, 57, 58, 123, 127, 145, 158; 2: 234, 252, 257, 274, 281, 284, 288, 292, 300³⁴².

⁶ Mendaña, 2: 252.

⁷ Quiros, 1: 154.

⁸ Friederici thinks the plant referred to was the taro.

⁹ Quiros, 1: 266.

¹⁰ Quiros, 2: 471.

¹¹ The word translated "potato" here and elsewhere in this paragraph is in the original Spanish accounts "papas." This is the term used in Peru for the ordinary potato (*Solanum*), grown in the cool highlands. The sweet potato (*Ipomoea*) on the other hand was grown in the warmer coast lands, and was known as "camote" (a word of Nahuatl origin) or as "batata" (its Antillean name).

¹² Quiros, 2: 376.

Leza, however, qualifies and obscures his statement immediately by adding "or rather another smaller kind of yam." Although he subsequently refers several times to "camotes" without any qualification, it might be thought that this is rather doubtful evidence for the presence of the sweet potato here in pre-Spanish times. The evidence is, however, greatly strengthened by the account of the voyage given by Torquemada¹³ who states that *both* sweet potatoes (*batatas*) and ordinary potatoes (*papas*) as well as yams were obtained from the natives here. There is thus some evidence, at least, for the presence of the sweet potato in eastern Melanesia at the beginning of the seventeenth century, when the first Spanish contacts were made.

The basic assumption thus, on which the whole theory of a Spanish introduction rests, would appear to be insecure, since for Polynesia it is founded on evidence for one island only, and is there purely negative and really of no value. For Melanesia the assertion as to the absence of the sweet potato seems to be disproved by the positive statements of De Leza and Torquemada.

The problem has been, however, further confused by the question of the plants introduced by the Spanish. Friederici admits that in the account of Mendaña's stay at Tahuata in the Marquesas reference is made only to the sowing of maize,¹⁴ but insists that it is certain that he must also have planted a variety of other things including the sweet potato. Obviously this is nothing but pure assumption. Moreover, in arguing for the absence of the sweet potato there originally, Quiros' failure to refer to it is accepted as valid evidence that it did not exist; in arguing for the Spanish planting of sweet potatoes, his failure to mention it is taken as no proof that it did not take place. To say the least, this is hardly logical. At Santa Cruz there is no indication that any planting was actually done. Reference is twice made¹⁵ to sowing as something later to be carried out, but the mutinous and tragic events which marked the Spanish stay would seem to have given no opportunity for realizing the plan. De Leza's statements in regard to Espiritu Santo are, however, explicit, for he says that Quiros sowed various seeds and specifically mentions the potato (*papas*).¹⁶ This, however, as has been noted, was the ordinary potato, not the sweet potato. The upshot of the whole matter thus seems to be that there is no explicit evidence that the Spanish planted the sweet potato anywhere, either in Polynesia or Melanesia, and that, on the basis alone of the accounts of the early Spanish

¹³ Torquemada, Lib. 5, Cap. 69.

¹⁴ Quiros, 1: 23.

¹⁵ Quiros, 1: 60, 94.

¹⁶ *Ibid.*, 2: 387. Zaragoza, 2: 165.

explorers, there is no evidence against and some evidence for the presence of the plant in the area at the beginning of the seventeenth century.

But if direct contemporary evidence is not wholly conclusive, the indirect evidence, that the sweet potato must already at that time have been long in use in Polynesia at least, is very strong. It rests on the distribution of the plant in the eighteenth century, on its relative importance as a food, on the traditional and concrete proof of its long use, and on the lack of opportunity for its diffusion if a Spanish introduction in the Marquesas should, for the purpose of argument, be granted.

In the decade from 1767 to 1777 most of the major groups and islands in Polynesia were discovered or rediscovered and described in some detail by Europeans. Tonga and New Zealand had, indeed, been seen by Tasman more than a hundred years before, and Easter island visited by Roggeween in 1722. But these earlier contacts were brief and the information given by the discoverers was often very limited. It is true also that the Hawaiian group had probably been visited by Saavedra and Gaetano in the early sixteenth century, but no details of their findings were ever made known. If we examine the accounts given by the voyagers of the decade from 1767 to 1777 and on into the first quarter of the nineteenth century, we find the following results.

In Easter island Roggeween, its discoverer in 1722,¹⁷ and every succeeding visitor down to and including Beechey in 1825 speak of the sweet potato as abundant, grown in large plantations, and as one of the mainstays of the native's food.¹⁸ In Hawaii, Cook, who rediscovered the group in 1778, and all following visitors note its abundance and excellence.¹⁹ In New Zealand Cook, Banks, and Parkinson describe²⁰ the importance of the sweet potato in the North island in 1769, although they do not mention it along those portions of the coast of the South island which they saw. Surville's expedition, which was at the North island in the same year, also found the plant in use, both Monneron²¹ and L'Horne²² referring to it. It is unfortunate that

¹⁷ Roggeween, *Dagverhaal*, 120; Linschoten Society Edition, 125; Behrens, 129. Friederici is in error in saying that Roggeween does not mention the sweet potato. It is difficult to see how the explicit statement, confirmed by Behrens, could have been overlooked.

¹⁸ Gonzalez, 101, 121, 123; Hervé, 121, 123; Amich, 67; Cook (3), 1: 278-82, 288; G. Forster, 1: 571-2, 578, 582, 587, 597; La Perouse, 3: 174, 197; Kotzebue, 1: 141; Beechey, 1: 32.

¹⁹ Cook (4), 2: 234-5, 254; 3: 106-7, 110-16, 141-2; Ellis (1), 2: 74-82, 91, 98, 114, 132, 144-5, 175, 179, 205, 227; Ledyard, 134; Portlock, 170, 198; Beresford, 109-10; Vancouver, 1: 170; Delano, 388.

²⁰ Cook (1), 2: 300, 313, 321, 358-66; Banks, 228; S. Parkinson, 97. For further details and discussion see Best (1).

²¹ Monneron, p. 105 (or in Macnab, 2: 287).

²² L'Horne, 319.

Tasman's contact with the Maori in 1642 was too slight for him to learn anything definite as to their food products. He does, however, mention seeing, when off the Three Kings islands, plants growing in "square beds, looking green and pleasant."²³ These must have been sweet potatoes or yams (or taro?) but we obviously cannot tell which. All that can be said is that although a hundred and thirty-five years later Cook speaks of yams as in use, neither Monneron²⁴ nor L'Horne²⁵ refer to them, and du Clesmeur,²⁶ in his journal of Marion's voyage three years later, specifically states that nothing but sweet potatoes and "pumpkins" were grown. Dumont-D'Urville in 1827 found no evidence of the use of yams at all, and went so far as to question Cook's earlier statement.²⁷ All visitors to New Zealand after Cook confirm the importance of the sweet potato in the North island, and found later that it was grown in the South island along the eastern coast as far south as Banks peninsula.

At the three extremes thus of the Polynesian triangle—Hawaii, Easter island, and New Zealand—the sweet potato was firmly established and an important or major article of food by 1778, 1722, or 1769. In all the remainder of Polynesia, however, we find a rather different state of affairs. Let us return to the Marquesas. Cook, who in 1774 was the first to revisit the group since Mendaña's day, does not specifically mention the sweet potato, although he does speak of yams and "some other roots" and states that the products of the islands were nearly the same as in Tahiti.²⁸ Forster, the naturalist who accompanied him on this voyage, likewise fails to refer to the sweet potato.²⁹ Marchand some sixteen years later, on the other hand, mentions in addition to yams "a sort of patate," i.e., the sweet potato.³⁰ In 1797 Wilson speaks of a "root like a yam,"³¹ but does not specify further. Fanning³² in 1798 makes no reference to the sweet potato. Neither Krusenstern³³ nor Lisiansky³⁴ refer to it in 1804, although Langsdorff³⁵ in his

²³ Tasman, 24.

²⁴ Monneron, *loc. cit.*

²⁵ L'Horne, *loc. cit.*

²⁶ du Clesmeur, 475. Roux in Macnab, 2: 399, confirms this.

²⁷ Dumont-D'Urville (1), 2: 469.

²⁸ Cook (3), 1: 308.

²⁹ G. Forster, 2: 10-17.

³⁰ Marchand, 1: 91; English translation, 1: 83.

³¹ Wilson, 143.

³² Fanning, 123-214.

³³ Krusenstern, 1: 161 and *passim*.

³⁴ Lisiansky, 87.

³⁵ Langsdorff, 1: 91; English edition, 1: 106.

account of the same voyage does. Porter,³⁶ Shillibeer,³⁷ and Stewart³⁸ all fail to mention it, but Roquefeuil³⁹ in 1817 and Dumont-D'Urville⁴⁰ in 1838 do. From this it would seem that in the Marquesas the sweet potato could not, during the fifty years after their rediscovery, have been a food of great importance. Jardin in 1858, in his short monograph on the botany of the group, tends to confirm this, since he says,⁴¹ speaking of Nukahiva, that the *Ipomoea batatas* "is beginning to be cultivated by the natives . . . not for their own use, but to sell to the whalers who sometimes touch here." In Handy's recent monograph⁴² on Marquesan culture, based on modern intensive study, the sweet potato is only once casually spoken of as of minor import. In the group thus, where Mendaña is supposed to have introduced the plant in 1595, it seems never to have been of much significance.

The Tuamotu group, consisting as it does only of coral islets, is not a favorable environment for the cultivation of the sweet potato, so that we are not surprised to find no reference to its use there at all. The Gambier group, of which Mangareva is the most important island, lies between the Tuamotus and Easter island. Although discovered by Wilson⁴³ in 1797, it remained unvisited until Beechey's time in 1825. He mentions sweet potatoes among the minor foods, but reports the natives as practicing very little agriculture.⁴⁴ Moerenhout⁴⁵ in 1834, two years after the coming of the missionaries, speaks of the sweet potato among the food products of the island, but repeats Beechey's statement that fruits and vegetables were little grown. Dumont-D'Urville in 1838 speaks⁴⁶ of the sweet potato as in use, but Montravel, one of his officers, states⁴⁷ in his journal that the French missionaries informed him that they had introduced the plant.

Wallis, the discoverer of the Society group in 1767, makes no reference⁴⁸ to the sweet potato. Bougainville⁴⁹ in the following year, however, speaks of it, as does Cook⁵⁰ in 1769, and is confirmed in this by both Banks⁵¹ and Parkinson.⁵² The Spanish expeditions which visited Tahiti between 1772 and 1774 specifically refer to the sweet potato as one of the food products of the island. Boenechea⁵³ speaks of the sweet potato, but says there were

"but few"; Bonacorsi⁵⁴ states that in addition to yams the natives had "a few red sweet potatoes"; Andia y Varela⁵⁵ refers to several varieties in cultivation, and Gayangos⁵⁶ in the course of his survey around the coasts of the island in 1772 secured in the district of Atehuru "sweet potatoes of a color like the yolk of an egg." That the sweet potato was, however, of only slight importance in Tahiti is clearly shown by the fact that Rodriguez, who lived for a year in 1774-75 in closest association with the natives and who visited every part of the island, refers to the plant but once.⁵⁷ Laufer, in endeavoring to substantiate the theory of a Spanish introduction, calls attention to the fact that Boenechea gave the natives seeds and sweet potatoes to plant⁵⁸ and then goes on to say that Andia y Varela speaks "a few years later" of two or three varieties as being grown. Laufer obviously seems to suggest that the sweet potatoes reported by Andia y Varela in 1774 were derived from those given the natives to plant by Boenechea two years before. This is a glaring example of a wrong conclusion being suggested by only partial presentation of facts. For Laufer omits to state that Boenechea himself explicitly reports the sweet potato as one of the native food products, and that during the time of his short stay at Mehetia and Vairua, Gayangos obtained supplies of sweet potatoes from the natives in Atehuru many miles away. He also passes over in silence the similarly explicit statements of Bougainville, Cook, Banks, and Parkinson, recording the presence of the plant four years before the Spanish first arrived. Bearing on this question is the statement made by Bligh⁵⁹ in 1792 to the effect that he found the natives "set no value on our garden products" and were indifferent to the European and other plants which he gave them. On his second and third voyages Cook does not again mention the sweet potato, nor does George Forster,⁶⁰ who was with him on the former, or Ellis,⁶¹ who was his surgeon on the latter. J. Reinold Forster, however, who accompanied his son George on the second voyage, refers⁶² to "potatoes" among the food products of the group, and Ledyard,⁶³ in his account of the third voyage in 1777, speaks of "sweet potatoes (though not in plenty)." Wilson⁶⁴ and Turnbull⁶⁵ at the turn of the century make no mention of it. Ellis the missionary, however, writing from experience gained during the second decade of the nineteenth

³⁶ Porter, vol. 2, *passim*.

³⁷ Shillibeer, 45-6.

³⁸ Stewart, 148.

³⁹ Roquefeuil, 1: 196.

⁴⁰ Dumont-D'Urville (2), 4: 13, 20, 22.

⁴¹ Jardin, 27.

⁴² Handy, 199.

⁴³ Wilson, 114 sq.

⁴⁴ Beechey, 1: 135.

⁴⁵ Moerenhout, 1: 88.

⁴⁶ Dumont-D'Urville (2), 3: 170.

⁴⁷ *Ibid.*, 363.

⁴⁸ Wallis, 219-20, 247, 253, 262.

⁴⁹ Bougainville, 199.

⁵⁰ Cook (1), 186; (2), 89.

⁵¹ Banks, 135.

⁵² S. Parkinson, 38.

⁵³ Boenechea, 327.

⁵⁴ Bonacorsi, 54-5.

⁵⁵ Andia y Varela, 275.

⁵⁶ Boenechea, 321.

⁵⁷ G. Forster, 1: 255, 263, 270, 274, 280-1, 342, 372-3, 380; 2: 51, 118.

⁵⁸ Ellis (1), 1: 89.

⁵⁹ J. R. Forster, 371.

⁶⁰ Ledyard, 48.

⁶¹ Rodriguez, 81.

⁶² Boenechea, 296.

⁶³ Bligh (2), 83.

⁶⁴ Wilson, 56-90, 148-223.

⁶⁵ Turnbull, 1: 127, 151.

century, says⁶⁶ that the sweet potato is grown, but to a far less extent than in Hawaii, and adds that it is inferior and used only as a makeshift when breadfruit is scarce.

For the Australs we have no significant data until after the missionary period. In the Cook group their discoverer, for whom they have been named, had no real contact with the natives at that time, but when he did so on his third voyage,⁶⁷ makes no reference to the sweet potato as in use. Williams⁶⁸ in 1823, who seems to be the next source of information, mentions the plant, but specifically says it was introduced by the missionaries. In Tonga, Tasman,⁶⁹ who discovered the group in 1643, mentions yams but not sweet potatoes, although he refers to "other roots which we had no knowledge of." Neither Cook⁷⁰ nor Forster⁷¹ mention the plant in 1774, nor does the former on his subsequent visit in 1777,⁷² although Ellis in his account of the voyage, does,⁷³ as well as Maurelle in 1781.⁷⁴ La Perouse⁷⁵ in 1785, Hamilton⁷⁶ in 1791, D'Entrecasteaux⁷⁷ in 1793, and Wilson⁷⁸ in 1797 are all silent in regard to it. Labillardiere,⁷⁹ however, who was with D'Entrecasteaux, mentions it. Mariner, who spent many years in the group in the early nineteenth century, does not speak of the sweet potato in describing the island's food products, but does give the name for it in his vocabulary.⁸⁰ Dillon⁸¹ in 1827 speaks of it several times, and notes its presence in Rotuma⁸² and Ticopia⁸³ as well. Dumont-D'Urville, who got much of his information from Singleton, Mariner's companion, who had been in Tonga since nearly the beginning of the century, does not refer to the sweet potato in his list of foods used in the group.⁸⁴ Le Maire and Schouten, who had discovered Fotuna in 1616, make no mention⁸⁵ of the plant there. In Tonga, thus, it would seem that the sweet potato was not of great importance.

⁶⁶ Ellis (2), 1: 50.

⁶⁷ Cook (4), 1: 177, 184, 197, 211.

⁶⁸ Williams, 578.

⁶⁹ Tasman, 26-33.

⁷⁰ Cook (3), 1: 187, 204, 213; 2: 9.

⁷¹ G. Forster, 1: 430-1, 441, 444, 478; 2: 171-2.

⁷² Cook (4), 1: 225, 235, 244, 272, 280, 306-7, 332, 366, 392.

⁷³ Ellis (1), 1: 89.

⁷⁴ Maurelle, 371, 390, 406.

⁷⁵ La Perouse, 3: 247-56.

⁷⁶ Hamilton, 52-134.

⁷⁷ D'Entrecasteaux, 1: 278, 318-19.

⁷⁸ Wilson, 91-112, 223-281.

⁷⁹ Labillardiere, 2: 101.

⁸⁰ Mariner, 2: 282.

⁸¹ Dillon, 1: 261, 265.

⁸² Dillon, 2: 94.

⁸³ *Ibid.*, 134 sq.

⁸⁴ Dumont-D'Urville (1), 4: 280-2.

⁸⁵ Le Maire and Schouten, 208-14.

With Samoa we reach the western verge of Polynesia. Here Roggeveen,⁸⁶ who discovered the group in 1722, makes no mention of the plant. Bougainville had little contact with the natives in 1768 and makes no reference to the sweet potato.⁸⁷ La Perouse⁸⁸ in 1785 is also silent, as is Williams,⁸⁹ who gives us our next significant data in the early '30's of the nineteenth century. Dumont-D'Urville,⁹⁰ who was at Upolu in 1838, also fails to refer to the plant. Wilkes⁹¹ the following year includes the sweet potato among the products of the group. Pickering,⁹² who accompanied Wilkes on the expedition, does not, however, mention it, and Turner,⁹³ who came there a few years later, explicitly states that it had been introduced by Europeans and was an unimportant food.

From this survey it seems to appear that at the end of the eighteenth century, nowhere in Polynesia except in Hawaii, Easter island, and New Zealand was the sweet potato a food product of importance, and there is doubt whether it was known at all in the Samoan and Cook groups. Friederici declares that it was a significant food in the above three regions only because other foods were scarce, and that elsewhere it was of no consequence because other foods were both better and in abundance. This statement would seem to be not wholly accurate. For at least in Hawaii yams, taro, breadfruit, and bananas were found by the early visitors to be abundant, although not equally so in all islands of the group. Easter island had an abundance of yams and bananas; only in New Zealand were other satisfactory vegetable foods lacking in variety and quantity. On the other hand, in much of Polynesia, although it is true that other foods were generally in abundance, there were times between crops when these supplies largely failed, and the sweet potato ought to have been a welcome substitute, as indeed Ellis states that it was in Tahiti.

The theory of a Spanish introduction of the sweet potato into Polynesia requires us thus to believe that a food-plant which, in the group where it was supposed to have been introduced by Mendaña, was little grown and little used, was nevertheless spread from thence by way of other groups where it was equally neglected or unknown, to the extreme limits of the Polynesian world. That a wide and relatively rapid diffusion might take place of a food plant which was extensively used and eagerly sought would be intelligible, but that one little used and little cared for should obtain

⁸⁶ Roggeveen, *Dagverhaal*, 186-197; Linschoten edition, 166-173.

⁸⁷ Bougainville, 236-9.

⁸⁸ La Perouse, 3: 102.

⁸⁹ Williams, 303-30; 374-416; 431-50.

⁹⁰ Dumont-D'Urville (2), 4: 92-125.

⁹¹ Wilkes, 2: 121.

⁹² Pickering, 73-78.

⁹³ Turner, 192.

such dispersion, strongly contravenes the probabilities. If Tasman's evidence for New Zealand is given any weight at all, the diffusion must have covered the distance from the Marquesas in less than fifty years; if no credence is placed on Tasman, the time available would, of course, be more than three times as long. But in this matter of diffusion from the Marquesas, however long a time we allow, there are almost insuperable difficulties in the way. For although inter-group contacts are abundantly recorded in tradition *within* Central Polynesia during the seventeenth and eighteenth centuries, the Hawaiian, Easter island, and New Zealand peripheral groups seem to have been completely isolated from all the rest of Polynesia throughout this whole period.

Each of the three outlying groups presents individual features in this respect. From Hawaiian tradition we know that communication with Tahiti occurred with some frequency in the twelfth and thirteenth centuries. These contacts and their approximate dates can, moreover, be corroborated and in large measure checked from the Tahitian end. Relations of less importance were had with the Marquesas, but no evidence is given, so far as I know, for any such contacts with either group after the fourteenth century. A diffusion of the sweet potato, therefore, from the Marquesas to Hawaii after Mendaña's visit in 1595 seems extremely improbable to say the least. At this point we may briefly refer again to the matter of the early Spanish discovery of Hawaii, and the possibility that the sweet potato was introduced there directly, prior to Mendaña's discovery of the Marquesas. It seems to be now accepted that in 1528 two of Saavedra's ships were wrecked on the islands, the few survivors intermarrying with the natives. The circumstances, however, were hardly such as to make it probable that the plant could have been introduced in this way. Gaetano seems to have visited the group some twenty-five years later, and would have had better opportunities. In view, moreover, of the extent of the Manila trade during the sixteenth century, it is not impossible that other Spanish ships may have touched there. Thus a *possibility* exists that the sweet potato was introduced in Hawaii more than two hundred years prior to Cook's time. Yet, Hawaiian traditions relating to this period are fairly full, and although they seem to record Saavedra's shipwreck, they are silent with respect to the introduction of any new foods. Furthermore, the carefully elaborated methods of cultivation, the part played by the plant in the oldest cosmogonic myths, and the fact that a number of chants and sacred charms used in connection with the sweet potato are in the more archaic form of speech, all speak for the very real antiquity of the plant's cultivation by the Hawaiian people. The case must probably be left open,

however, for on the face of it, no absolute statement either way can be made. All that appears to be reasonably certain is that a Marquesan source for the sweet potato during the seventeenth and early eighteenth centuries seems extremely improbable.

For Easter island the case is simpler. Although the available traditional data are much less complete than in Hawaii, there is no indication, either from local sources or from other neighboring islands, of any outside contacts for several centuries prior to Roggweeen's discovery in 1722. Unlike the people of most Polynesian groups, the Easter islanders had no large sea-going canoes, and only a few poor ones of very small size.⁹⁴ In their own craft it would have been impossible for them to have made the long voyage to the nearest inhabited group, which lies some fifteen hundred miles away. The people of Mangareva, who were their nearest neighbors, were likewise apparently unable to make any such voyage, since they had no canoes at all, but employed sailing rafts which were used primarily within the lagoon.⁹⁵ It is true that Roquemare⁹⁶ and Jacquinot⁹⁷ in 1838 saw several poor canoes, but Moerenhout⁹⁸ four years before had seen none; in the interval the French missionaries had come. So although Beechey reports the sweet potato in use at Mangareva, the probability that it had been carried thence to Easter island, at any rate in recent times, seems almost negligible. The people of the Tuamotus, at least in the western portion of the group, had excellent sea-going canoes, but they could hardly have been the carriers of the sweet potato to Easter island, since at no time was it grown in the group.

For New Zealand the evidence is more complete and still more convincing. A wealth of genealogical and historical tradition was preserved by the Maori, and however little confidence one may have in the older material, there can be little doubt that back as far as the thirteenth or fourteenth centuries the chronological basis of their history is fairly reliable. The abundance of material allows of pretty extensive checking, and for the relations with the Society and Cook groups much of the history is corroborated and cross-checked from material recovered there. On the basis of this data it appears that the immigrant ancestors of the dominant majority of the Maori came to New Zealand in a famous "Fleet" of six canoes from Tahiti about the middle of the fourteenth century. They found in occupation an

⁹⁴ Roggweeen, Linschoten edition, 124; Gonzalez, 121; Cook (3), 1: 294; G. Forster, 558; 583; La Perouse, 2: 94; Beechey, 1: 40.

⁹⁵ Beechey, 1: 143-4.

⁹⁶ Dumont-D'Urville (2), 3: 400.

⁹⁷ *Ibid.*, 422-3.

⁹⁸ Moerenhout, 1: 109.

older stratum of mixed origin, derived in part from an earlier migration from Tahiti, believed to have arrived at least two centuries before, and in part from an aboriginal population, the vague accounts of which are contradictory. According to some of the traditions the sweet potato and taro were brought with them by the earlier immigrants and had been unknown to the aboriginal folk. According to others, it was the later or fourteenth century conquerors who, not finding the sweet potato in New Zealand, sent the "Horouta" canoe back to Tahiti for it. After the coming of the "Fleet" communication was kept up at intervals with both Tahiti and Rarotonga, but this ceased entirely in the fifteenth century. Although one or two canoes sailed from New Zealand after that date, as late indeed as the seventeenth century, none ever returned, and no foreign canoes again came from the outside world.⁹⁹ The Maori had thus been entirely isolated, so far as traditional evidence goes, during the whole period during which any diffusion of the sweet potato, if introduced by the Spanish, could have occurred. The actual introduction, thus, of the plant in New Zealand took place according to traditional data at the latest in the middle of the fourteenth century, at the earliest sometime in the twelfth or even before.

Further light on the problem comes from the Moriori of the Chatham islands, isolated five hundred miles or more to the eastward of New Zealand. The indications are clear that they represent the descendants of a group of immigrants who came from New Zealand, at a date which traditional evidence would place about the beginning of the thirteenth century.¹⁰⁰ These traditions recount that they found it impossible, on account of different climatic conditions, to grow in their new home the sweet potato and taro which they had brought with them. In consequence the plants died out. When the islands were discovered by Broughton¹⁰¹ in 1791, neither the sweet potato nor the taro were in use, but the names for them were still remembered, and the people had preserved a recollection of their former use. No contacts either with New Zealand or any other portion of Polynesia occurred, so far as known, between the time of the settlement of the islands and their conquest by the Maori in the early nineteenth century. It is difficult to explain these facts other than by accepting that the sweet potato was already known and in use in New Zealand in the thirteenth century, thus corroborating those Maori traditions which speak of its importation from Tahiti by the earliest immigrants, who had settled in New Zealand in the twelfth century. This also accords with the traditions of the Maori of the South island, according to which the sweet potato was intro-

⁹⁹ Best (2), 292-293.

¹⁰⁰ Skinner, 16-21.

¹⁰¹ Vancouver, 2: 84 sq.

duced there toward the end of the thirteenth.¹⁰² On this basis, the other traditions of a later introduction in the fourteenth century might be explained perhaps as referring to the importation of certain varieties only. The contradictions can also be explained in other ways.

Still further corroborative evidence of the very considerable antiquity of the cultivation of the sweet potato in New Zealand is supplied not only by frequent references to the plant in the most archaic cosmogonic chants and myths, its close association with one of the major Maori gods, and the elaborate religious rituals connected with its planting, cultivation, and storage,¹⁰³ but also by concrete indications given by the great age and area of the sweet potato plantations and by the influence which this food had exerted on the material culture of the people. When the earliest English missionaries and settlers came to New Zealand in the early decades of the nineteenth century, they found very extensive ancient clearings which had been made for the cultivation of the sweet potato. In some comparatively small districts these were estimated at over eight hundred acres.¹⁰⁴ Pits, from which was obtained the gravel necessary for the hills in which the plant was grown, were found that had been excavated to depths of five or six feet, and covering many acres.¹⁰⁵ In some of these, large trees of great age were growing. The magnitude and demonstrable age of these once cultivated areas are thus as incompatible with an introduction of the sweet potato as late as the seventeenth century, as is the abundance and complexity of its associated rituals.

In his argument in favor of Spanish introduction, Friederici¹⁰⁶ insists that the Maori accounts of the introduction of the sweet potato prove that this really occurred very late, since the canoes in which the immigrants came were "doubtless" double canoes, as no other kind would have been able to make the voyage, whereas the "Horouta" canoe, which by tradition brought the sweet potato, was not a double canoe. Therefore, as the double canoe was in use in New Zealand in Tasman's time in 1642, but had largely gone out of use when Cook came in 1769, the introduction of the sweet potato must have been subsequent to the period of Tasman's visit, as prior to that time the inference is that the single canoe was not in use. The facts of the matter are that of the six canoes which made up the historic "Fleet" only the "Arawa" was a double canoe, the others including the "Horouta" being large outrigger canoes of the type long and often used throughout Polynesia for long distance voyages.¹⁰⁷ In New Zealand, the outrigger type

¹⁰² Best (1), 7.

¹⁰³ Best (1), *passim*.

¹⁰⁴ *Ibid.*, 62.

¹⁰⁵ *Ibid.*, 60 sq.

¹⁰⁶ Friederici, 483 sq.

¹⁰⁷ Best (2), 279 sq.

of canoe went out of use much earlier than the double. The argument is also absurd, since it implicitly asserts that the whole Maori conquest and settlement had taken place less than six generations before Cook's visit, which is utterly incompatible with everything known of Maori culture.

A further argument in favor of the antiquity of cultivation of the sweet potato in Polynesia lies in the large number of varieties known in Easter island and New Zealand. Absolutely precise data are lacking, but with every allowance for duplication and overlapping, the number known to the Maori must have been at least twenty or twenty-five. Friederici, after discounting far too heavily the data on the number of varieties known, says that since there were three (four) early Spanish contacts in the Pacific, extending over a stretch of forty years, they might well have brought with them a number of varieties, and that these in a period of a hundred and fifty or two hundred years might easily become so much further diversified as to account for the facts. He quite forgets, however, that (1) the greatest number of varieties existed not in those places to which the Spanish went but in Easter island and New Zealand, which were most remote from any of their contacts; and (2) that the Spanish touched only once at each of four groups, so that according to his theory different varieties must have been taken to each, and the great number of varieties in Easter island and New Zealand must have been due to an *eastward* diffusion of three of these from Melanesia, an almost impossible assumption. Furthermore, this theory leaves out of consideration that the number of varieties of the sweet potato known in Peru, whence the Spanish are supposed to have brought it, is small compared to that recorded in Polynesia.

In the face of all the evidence it thus seems clear that a diffusion of the sweet potato during the seventeenth and eighteenth centuries from the Marquesas to the outlying groups in Polynesia would have been practically impossible, and we must admit that certainly in New Zealand, and with great probability in Easter island and Hawaii, the sweet potato had been in use as an important food product long before the earliest Spanish contacts with Polynesia took place. Further, it is clear that in much of the rest of Polynesia, although known and cultivated in the eighteenth century and probably long before, it was of little economic or other significance, and was generally neglected. That it was grown in Tahiti as early as the twelfth century would follow from its probable introduction thence into New Zealand at that time. We know that racially the population of Central Polynesia underwent a profound change in early mediaeval times, as the result apparently of a large scale immigration of newcomers from the west. Although we are dealing here admittedly with conjecture only, it may be that

one of the consequences of this phenomenon was the gradual neglect of the sweet potato in Central Polynesia, where earlier it may have held a position of greater importance. The detailed comparative studies of Polynesian culture which have been made during the last few years have demonstrated that we may apparently distinguish in it an ancient and a more modern stratum. The former now survives most abundantly in the marginal areas, whereas it has been overlaid and in some cases largely superseded by the later culture in the central area. It is precisely in these marginal areas that the sweet potato was of the greatest importance at the time of the discovery, and seems to have been an old established food. The correlation is difficult to ascribe to chance, and no selective diffusion from an introduction by the Spanish in the Marquesas in the sixteenth century can account for the facts, even if diffusion had been possible, which I believe we may say it was not. I can see, therefore, no escape from the conclusion that the sweet potato had spread throughout Polynesia in pre-Columbian times, and that consequently the theory of a Spanish introduction by way of the Marquesas is untenable.

Turning now to the data available for the period of rediscovery in eastern Melanesia, a somewhat peculiar situation is disclosed. In Fiji although Bligh¹⁰⁸ passed by the northern islands in 1789 the earliest known European contact was that of the "Pandora's" tender in 1791, but of this we have unfortunately no accounts.¹⁰⁹ Bligh¹¹⁰ on his second voyage in 1792, does not mention the sweet potato, nor does Dillon¹¹¹ in his account of his adventure in 1813. Dumont-D'Urville,¹¹² who in 1827 was the first to make any extended reconnaissance, also does not mention the plant as a food product there, nor does he refer to it¹¹³ during his second visit in 1838. So far as I know, Wilkes¹¹⁴ in 1840 is the first person to speak of the sweet potato here, but he omits it from his list of the native products, and mentions it only casually at Oneata, one of the small islets of the eastern group, where Tahitian missionaries had been in residence since 1820, and where he also mentions corn. Williams,¹¹⁵ who came to the islands in 1845, speaks in 1858 of the sweet potato as grown in abundance, but at that time white missionaries had been in the group for nearly a quarter of a century and beche-de-mer and other traders longer still. Seeman¹¹⁶ in 1860, in a detailed discussion of the vegetable foods, speaks of the sweet potato only in con-

¹⁰⁸ Bligh, 179 sq.

¹⁰⁹ Hamilton, 166-7; Edwards, 51, 81.

¹¹⁰ Bligh (2), 231 sq.

¹¹¹ Dillon, 1: 1-37.

¹¹² Dumont-D'Urville (1), 4: 397-458.

¹¹³ Dumont-D'Urville (2), 4: 171-261, 381-409.

¹¹⁴ Wilkes, 3: 170.

¹¹⁵ Williams and Calvert.

¹¹⁶ Seeman, 306.

nection with the white potato, shalots, and turnips, all of European introduction. He also states that it does not seem to be much valued and suggests that it had been brought in from New Zealand. Since the older Fijian term¹¹⁷ for sweet potato is a-karai-ni-vaalagi meaning "European vine," it would appear to show unmistakably that, in confirmation of the other evidence, the sweet potato was absent in Fiji until introduced sometime in the nineteenth century. In view of the close contacts which the Fijians had with Tonga, this would hardly have been expected, yet in the face of the available evidence it seems difficult to draw any other conclusion.

Our first information relative to the New Hebrides, after Quiros' visit in 1606, comes from Bougainville in 1768. In his brief account¹¹⁸ he makes no mention of the sweet potato. Cook¹¹⁹ on his second voyage in 1774 came into contact mainly with Tanna and Mallicolo, but only at the former does he mention "a sort of potato." Forster¹²⁰ makes no reference to the plant. We get little further data on the group until the missionary period of the middle of the nineteenth century. Codrington,¹²¹ in his general work on Melanesia published in 1891, in speaking of the food products of the region, does not refer to the sweet potato, nor so far as I can find, do the other missionaries such as Inglis,¹²² Lamb,¹²³ Paton,¹²⁴ or Patteson,¹²⁵ who have written of particular islands, or Erskine,¹²⁶ Goodenough,¹²⁷ or Markham,¹²⁸ who cruised among the islands in the middle of the century. Brenchley¹²⁹ however does mention it at Aneityum and Tanna in 1865. Speiser,¹³⁰ who is our most recent student of the whole area, says that today the sweet potato is but little used, and appears to be known only in northern Espiritu Santo, Ambrym, and Aneityum. To this Humphreys¹³¹ adds Tanna. It may be noted that the only term for sweet potato reported¹³² in any of the New Hebridean languages (Aneityum) is "waleh" or "inwaimeteuc," neither of which shows any obvious relationship to the "kumara" used throughout Polynesia.

Cook in 1774 was the discoverer of New Caledonia. His contact was brief, and neither he¹³³ nor Forster¹³⁴ mentions sweet potatoes among the

¹¹⁷ Tregear, 182 (under "kumara").

¹¹⁹ Cook (3), 2: 77.

¹²⁰ G. Forster, 2: 221, 226, 270, 290, 298, 336, 347.

¹²¹ Codrington, 319 sq.

¹²² Inglis (2).

¹²³ Lamb.

¹²⁴ Paton.

¹²⁵ Patteson.

¹²⁶ Erskine, 299-347.

¹²⁷ Goodenough, 273 sq.

¹¹⁸ Bougainville, 242 sq.

¹²⁸ Markham, 175 sq.

¹²⁹ Brenchley, 199, 213.

¹³⁰ Speiser, 132.

¹³¹ Humphreys, 62. For Aneityum, 109.

¹³² Inglis (1), 173.

¹³³ Cook (3), 2: 116, 122-3.

¹³⁴ G. Forster, 2: 388, 401, 415.

foods seen at Balade. D'Entrecasteaux¹³⁵ in 1793 seems to have been the next observer. He also fails to refer to the sweet potato, but in Labillardiere's account¹³⁶ of the same voyage, it is stated that plantations of yams and sweet potatoes were seen at Balade, and both he¹³⁷ and Rossel¹³⁸ give in their vocabularies the term "tani" as used for the plant. As in the New Hebrides the word used for the sweet potato has thus no apparent relation to the universal Polynesian form. Except for these references in 1793 no one, so far as I know, has mentioned the sweet potato as grown in New Caledonia. Neither Erskine¹³⁹ in 1849, nor Brenchley¹⁴⁰ in 1865, speaks of it. Lambert¹⁴¹ in a whole volume devoted to the island also omits it as does Leenhardt.¹⁴² Sarasin¹⁴³ says it is of recent introduction. For the Loyalty islands I can find no reference to the plant in the older accounts, but Hadfield,¹⁴⁴ the most recent writer on the group, states that it is grown today.

Carteret¹⁴⁵ in 1767 seems to have been the first to rediscover the Santa Cruz group but makes no reference to the sweet potato. In 1793, however, D'Entrecasteaux¹⁴⁶ records the use of "patates sucr  " at Ndeni itself, and Dillon¹⁴⁷ confirms this for Vanikoro in 1826. The Solomons were also rediscovered by Carteret in 1767, but no mention is made¹⁴⁸ of the sweet potato as in use by the natives. Bougainville¹⁴⁹ a year later also fails to mention it, and the same is true of Surville,¹⁵⁰ D'Entrecasteaux,¹⁵¹ Labillardiere,¹⁵² and Dumont-D'Urville.¹⁵³ Not until after the middle of the nineteenth century do we begin to get much detailed data for the group. Neither Codrington¹⁵⁴ nor the other later missionaries refer to the sweet potato, nor does Brenchley.¹⁵⁵ Guppy¹⁵⁶ speaks of it as one of the foods in the western islands, Ribbe¹⁵⁷ mentions it in Rubiana and the Shortland islands, and Frizzi,¹⁵⁸ writing of the Nasioi in Bougainville, says that the sweet potato has been recently introduced there, and is rapidly supplanting the yam. Parkinson,¹⁵⁹ however, who was in the same area a generation earlier, does

¹³⁵ D'Entrecasteaux, 1: 327-361.

¹³⁶ Labillardiere, 2: 195.

¹³⁷ Labillardiere, 2: 232.

¹³⁸ D'Entrecasteaux, 1: 580.

¹³⁹ Erskine, 348 sq.

¹⁴⁰ Brenchley, 342-4.

¹⁴¹ Lambert, 214 sq.

¹⁴² Leenhardt, 106 sq.

¹⁴³ Surville, in Fleurieu, 124 sq. Monneron, in LaBorde, 50 sq.

¹⁴⁴ D'Entrecasteaux, 123-25, 383 sq.

¹⁴⁵ Labillardiere, 2: 222 sq.

¹⁴⁶ Dumont-D'Urville (2), 5: 17-122.

¹⁴⁷ Codrington, 319 sq.

¹⁴⁸ Brenchley, 248-93.

¹⁴⁹ Sarasin, 61.

¹⁵⁰ Hadfield, 71.

¹⁵¹ Carteret, 348-63.

¹⁵² D'Entrecasteaux, 1: 369.

¹⁵³ Dillon, 2: 273.

¹⁵⁴ Carteret, 365.

¹⁵⁵ Bougainville, 258 sq.

¹⁵⁶ Guppy, 82.

¹⁵⁷ Ribbe, 223 sq; 262 sq; 307 sq.

¹⁵⁸ Frizzi, 25.

¹⁵⁹ R. Parkinson, *passim*.

not refer to it. Ivens¹⁶⁰ in a recent detailed study of the southeastern islands is silent in regard to it. He does include it in his dictionary,¹⁶¹ however, and notes that in addition to its Polynesian name of "kumara," it is also known as "uhi ni haka," i.e., the imported yam.

From all this it would appear that, although in Fiji the presence of the sweet potato is not attested before 1840 when it was called the "European-vine," it was in use in New Caledonia and the Santa Cruz group in 1793. For the New Hebrides and Solomons there is no mention of its cultivation until the missionary period of the middle of the nineteenth century and after, and this modern information shows that its distribution is sporadic. Although contacts between Fiji and Tonga were frequent, and between Fiji and Samoa somewhat less so, its relations with the other groups in eastern Melanesia were slight. The Fijians made extremely good canoes but were not themselves much given to long distance voyaging. Western Polynesia's relations with the rest of eastern Melanesia were rather by way of Rotuma and Ticopia and so to the Santa Cruz group. By this route a diffusion of the sweet potato by way of the Banks islands and New Hebrides to New Caledonia would have been possible. It is, however, much more probable that the introduction in New Caledonia (if it ever occurred) was directly from Tonga by way of the Loyalty islands, inasmuch as we know of unintentional drifts thither within the historical period. Similar drifts are likely also to have taken place to the New Hebrides. Yet although Cook¹⁶² in his day and others since have noted the linguistic similarity between Tongan and the dialect of Balade in New Caledonia, where Labillardiere reports the sweet potato in 1793, the names in use for it there as well as in Aneityum in the New Hebrides are, as we have seen, totally different from that employed in Tonga and all the rest of Polynesia. Cook¹⁶³ also noted Tongan analogies in the language spoken in the bay of St. Phillip and St. James in Espiritu Santo in the New Hebrides, a fact confirmed by Ray¹⁶⁴ in his recent monograph on Melanesian languages. Unfortunately the word for sweet potato is not included in any of the brief vocabularies which have been published, so that no comparison can be made.

Definite conclusions in regard to a Spanish origin for the sweet potato in eastern Melanesia are thus pretty certain. There is no positive evidence of any Spanish planting anywhere, only the possibility that Mendaña *might*

¹⁶⁰ Ivens (1).

¹⁶¹ Ivens (2), 48.

¹⁶² Cook (3), 2: 106, 120.

¹⁶³ *Ibid.*, 91.

¹⁶⁴ Ray, 16.

have introduced it in Santa Cruz. In the New Hebrides at their rediscovery the sweet potato was not reported; today it is sporadic and little used. In Santa Cruz it has been reported by all observers since 1793, but it could just as well have reached there by normal diffusion from Tonga by way of Rotuma and Ticopia as be traceable to the dubious Spanish introduction. If the sweet potato was really ever grown in New Caledonia, it could well have come from a Polynesian (i.e., Tongan) source. It might, of course, be argued that all western Polynesia, at least, received the sweet potato from Melanesia after a Spanish introduction. Such an argument would, however, have to rest its case solely on Santa Cruz. And although a diffusion eastward from Santa Cruz by way of Ticopia and Rotuma is theoretically possible since trade and other relationships along this line are known to have occurred, the contributory evidence afforded by data on cultural diffusion in this region seems rather in favor of a westward and not an eastward movement. The evidence is possibly less specific than in Polynesia, but I think we are justified in finding that there is no reason to believe that the sporadic occurrence of the sweet potato in eastern Melanesia, as described by the explorers of the end of the eighteenth century, is to be attributed to an introduction by the Spanish at the beginning of the century before.

In Polynesia I have tried to show that a diffusion of the sweet potato from a purely hypothetical introduction in the Marquesas was incompatible with the facts and physically impossible. In Melanesia, I have, I believe, brought forward enough evidence to show that a Spanish origin for the plant is also inadmissible. With a Spanish source of introduction in the sixteenth and seventeenth centuries thus eliminated, we are brought face to face with the problem of pre-Columbian contacts between South America and Polynesia, and must explain the presence of the sweet potato in the Pacific as due either to Polynesian voyagers who, reaching American shores, brought back the plant with them on their return to their homeland, or to Peruvian or other American Indians who sailed westward and carried the sweet potato with them to Polynesia thousands of miles away. In either case the similarity of name for the plant in Polynesian and Kechua speech is a striking fact and one upon which great stress has been laid. In a later article I hope to discuss this, as well as some other aspects of the problem thus raised.

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NOTES ON THE PUEBLO CULTURE IN SOUTH-CENTRAL NEW MEXICO AND IN THE VICINITY OF EL PASO, TEXAS

By W. S. STALLINGS, Jr.

FOREWORD

THE object of this paper is to present some data about an area of which the archaeology is practically unknown. Since in a short essay it is impossible to cover all phases, it is limited to the physiography in its relation to the archaeological sites and to pottery, for I believe these and architecture are the three most important features in an introductory study of the archaeology of a Pueblo district at the present time. So little excavation has been done that a worthy presentation of the local architecture is out of the question; and though there is excellent stone work in the area, this, too, must take a subordinate position.

The compilation of the data has been made possible through the generous help of the amateurs of the district. I am particularly obliged to Mr. and Mrs. R. B. Alves of El Paso, who gave me unlimited access to their extensive collections and escorted me to many of the sites. I owe much to Mrs. G. Windsor Smith of El Paso, and to Mr. L. A. Cardwell of Las Cruces. Also, I wish to thank the personnel of the El Paso Public Library, Mr. John Stuart of Mesilla Valley, Mrs. James of Doña Ana, Mrs. Olmstead of Lincoln, and Mr. Bonnell of the Ruidosa, for their courtesies and aid. Finally, I wish to extend to Mr. C. B. Cosgrove my appreciation for the use of plates of several artifacts which he uncovered, and to thank Dr. Byron Cummings and Mr. E. W. Haury for their valuable aid and criticism.

INTRODUCTION

The region under discussion, on the southeastern periphery of the Pueblo culture area, has but comparatively recently incited the interest of the Southwestern archaeologist.¹ This interest has been aroused mainly through the efforts of amateurs, of whom, because of their persistence and influence, I must mention Colonel Martin L. Crimmins and Mrs. R. B. Alves, both vitally associated with the El Paso Archaeological Society. Under its auspices Mr. and Mrs. C. B. Cosgrove excavated a site at Three Rivers, New Mexico, in 1925 and made a reconnaissance of the Pueblo cul-

¹ Ellsworth Huntington, geographer, noted the occurrence of three sites in 1914, in *The Climatic Factor*, 192: 72. Carnegie Institute of Washington (Washington), Publ. 1914.